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ABSTRACT

In a conventional teaching situation, a lecturer may use a wide range of questioning techniques aimed at helping students to become active learners. In distance learning, students are often isolated and have limited opportunities for interaction in a social learning environment. Hence, learning strategies in distance learning need to be structured carefully to overcome this deficiency. The use of questions is one of the learning strategies available to assist in the development of didactic conversation. In particular, self-assessment questions (SAQs) have been used in distance education materials to provide feedback to students and to motivate students to search and think about some aspect of knowledge. Student-generated questions can be encouraged in order to lead students into adopting a deep approach to learning as opposed to a surface approach. Encouragement may take the form of verbal questions, written questions, and/or self-questioning. Instructors can demonstrate a sample approach. They can also ask students to write an assignment summarizing some concept including questions that the studied passage does not answer or does not raise. Students could also be asked to formulate a hypothesis and then present a reasoned argument for or against it. Textual design can also play a role. For example, the use of wide margins in text materials allows space for students to write questions in the margins. "Scaffolds" can be used to lead students to use higher-level thinking. In order to apply self-questioning strategies, students need to develop metacognitive skills so that they can monitor their learning and decide what learning strategies are appropriate in a given context. (Contains 28 references.) (KC)

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A question of questions

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A question of questions

Abstract

In a conventional teaching situation a lecturer may use a wide range of questioning techniques. These strategies are aimed at helping students to become active learners rather than passive learners.

In distance learning, students are often isolated and have limited opportunity for interaction in a social learning environment. Hence, learning strategies in distance learning need to be carefully structured to overcome this deficiency. The role and use of questions is one of the repertoire of learning strategies available to assist in the development of didactic conversation. In distance learning, little work has been reported on the role and use of questioning strategies.

The paper explores some of the ways of how questions can be used in distance learning to motivate and stimulate the student. It pays particular attention to questioning when a range of media are used as course materials.

Finally, it reviews work on some of the strategies available and possible benefits. It emphasizes the need for more research to be undertaken in the area.

A question of questions

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Questions are an important tool in teaching and learning. Traditionally, in distance education questions are used in three ways. First, they are used as adjunct questions within text, secondly, as self-assessment questions and thirdly, as assignment and examination questions.

Adjunct questions are in-text questions located in headings, glosses (marginal notations) or embedded in the text. A considerable amount of research has been undertaken on adjunct questions. This work has been reviewed by Hamilton (1985), Hamaker (1986) and Andre (1987). With the exception of some work by Duchastel and Whitehead (1980) nearly all this work has been done in on-campus environments.

For the distance education environment, Marland and Store (1982) warn that "it would be rash to assume therefore, that generalisations about the facultative effects of adjunct questions appearing in the reviews cited above [Anderson & Biddle, (1975), Faw & Waller (1976) and Rickards and Denner (1978)], would apply to the real-life study contexts of distance learners." These conflicting results need elucidating through further research in a distance learning context.

Self-assessment questions (SAQ's) have been used in distance education materials to provide feedback to students and to motivate the student to search and think about some aspect of knowledge. In comparison to adjunct questions, research into SAQ's has been a somewhat neglected area. The research that has been done has produced conflicting results; some students ignore them, others skim over them, while others attach importance to them [Duchastel & Whitehead (1980) and Clyde *et al* (1982 & 1983)].

Similarly, another neglected research area concerns questions in assignments or examinations. What can be said is that the research clearly shows that the nature of the questions set in assignments and examinations, influence students approaches to learning.

What is the relationship between these three question types and new learning theories?

There appears to be little research which positively illustrates the effectiveness of these questioning techniques in distance education. However, current learning theories may well put paid to it all anyway.

In the last ten years there has been increased attention given to cognitive science. The work by Marton and Saljo (1976), Saljo (1979), and Svensson (1977) distinguished between surface and deep level approaches to learning tasks. Its specific application to distance education has been reviewed, amongst others by Gibbs, Morgan and Taylor (1982).

Biggs (1987) has described a student who adopts a deep approach to learning as one who:

"* is interested in the academic task and derives enjoyment from carrying it out;
* searches for meaning inherent in the task (if a prose passage, the intention of the author);
* personalises the task, making it meaningful to (their) own experience and to the real world;
* integrates aspects or parts of the task into a whole (for instance, relates evidence to a conclusion), sees relationships between this whole and previous knowledge; and
* tries to theorize about the task, forms hypothesis."

A student who adopts a surface approach as one who:

"* sees the task as a demand to be met, a necessary imposition if some other goal is to be reached (a qualification for instance);
* sees the aspects or parts of the task as discrete and unrelated to each other or to other tasks;
* is worried about the time the task is taking;
* avoids personal or other meanings the task may have; and
* relies on memorization, attempting to reproduce the surface aspects of the task (the words used, for example, or a diagram or mnemonic)."

The application of this cognitive science research into the distance learning areas appears to be very slow. Kember (1991) commented on the fact and cited support by Reigeleuth (1989) and Merrill, Li & Jones (1990). They indicated that current instructional design theories are firmly rooted in behavioural psychology and appear to be resisting applications of cognitive science research.

How can we as distance educators encourage deep-level learning?

Deep level approaches have been shown to lead to effective and meaningful learning (eg Gibbs *et al* 1982). Such approaches have been linked with a student adopting a self-questioning internalized dialogue with the materials.

So, one way is by encouraging appropriate question-asking by learners. This may take the form of verbal questions, written questions and/or self-questioning. Currently, in most distance education materials all the questions are directed *at* the student. There is little opportunity given for the student to pose questions. How could we encourage the generation of questions *by* students in distance education?

There are numerous strategies that we could adopt. In the print medium using self-assessment questions we can ask the student to formulate some questions that result from the prior reading of material or the passage they are just about to read or to view. We can then provide sample questions ourselves in the feedback answers.

Another approach is for students to write an assignment summarising some concept and asking them to include questions that the studied passage does not answer or does not arise. We could ask students to formulate a hypothesis and then a reasoned argument for why the hypothesis may or may not be able to be sustained. Such a process will involve self-questioning techniques.

Textual design can also play a role. For example, by providing space for responses/questions with the SAQ's. The use of wide margins in text materials can be used to encourage students to write questions in the margins.

It was pointed out by Hynes (1986) that "there is a subtle difference between telling students to ask questions, telling them to think about what they did last lesson, telling them to find problems in the topics being studied, and teaching them to perform those activities or creating an atmosphere in which they can take more initiative for their own learning."

More recently Dole *et al* (1991) has reviewed reading comprehension instruction. They found that "...student-generated questions are rarely used, even though they have been shown by Andre and Anderson, (1978-79) to lead to deeper levels of text processing (Craik & Lockhart, 1972)." In reviewing the research it was found critically important to provide appropriate instruction.

Wong (1985) has made an extensive review of self-questioning instructional research. She found that the effects of such training on students' prose processing are successful. The constraints of content knowledge and metacognitive deficiencies are pin-pointed in the review.

How then can cognitive strategies such as self-questioning be taught?

It was Ausubel who first used the phrase 'scaffolding' for instructional procedures to describe supports provided by the teacher or another student to help students bridge the gap between their current abilities and the new intended goal. Scaffolds can take the form of tools, such as cue sheets and advance organisers, or techniques, such as teacher modeling, talking aloud and reciprocal questioning. As Rosenshine and Meister (1992) indicate, scaffolds are very useful for teaching higher-level cognitive strategies. Instead of providing steps applicable to a specific situation they believe a teacher should provide scaffolds or supports to help the students learn the general skill.

It is important to make sure that the scaffolds provide support at the appropriate student level of understanding or as Vygotsky (1978) terms it, the students "zone of proximal development. The analogy of a building is a useful one. You would not erect scaffolding to the 10th floor when the building is only at the 5th floor. Ultimately, when the building is close to completion the scaffolding is removed.

The use of scaffolds for teaching higher-level cognitive strategies has been discussed by Rosenshine and Meister (1992) and presented as a series of six steps:

1. Present the new cognitive strategies.

2. Regulate difficulty during guided practice.

3. Provide varying contexts for student practice.

4. Provide feedback.

5. Increase student responsibility.

6. Provide independent practice.

Can these strategies be applied to distance learning to teach the development of self-questioning strategies? Yes, for example, when introducing the new strategy of self-questioning (step 1) modelling the skill can be done by working through a passage giving examples of questions that should be forming in the mind of the students. Thinking aloud can be provided through an audiotape or by audio teleconferencing. Similarly, reciprocal teaching as a means of providing varying contexts for developing the self-questioning strategy (step 3) can be done in a study group setting either face-to-face or through a teleconference link.

Once students develop the self-questioning strategy the next question is when do they use it? The simple answer appears to be - all the time. However this is not appropriate in real life situations. Students need to develop the skill to recognise when higher-order cognitive strategies are needed, that is, they need to develop metacognitive skills.

Metacognition and questioning

Metacognition has been defined by Flavell (1976) as "one's knowledge concerning one's own cognitive processes and products...(and) the active monitoring and consequential regulation of these processes in relation to the cognitive objects or data which they bear" (Biggs, 1987).

Metacognition is composed of two parts. The first refers to the learners awareness and knowledge of their own learning processes. The second is concerned with the monitoring and regulating of the learning.

How can students be encouraged to develop metacognitive skills?

The development of metacognition requires a knowledge by the students of the higher cognitive strategies they are able to use. It also requires the skill to select the strategy appropriate to a set task. The final part of metacognition involves monitoring and regulating the strategy that is most appropriate.

The major tool for applying metacognition to learning is through the self-questioning approach. It is through self-questioning that we ascertain what strategy is required, whether it is working and whether the goal has been achieved. The techniques for teaching this strategy are the same as for training the student in self-questioning technique.

Conclusion

By course developers instituting techniques in accord with certain learning theories, students can be encouraged to develop self-questioning strategies. These strategies are the same ones that are required to develop metacognition. Both self-questioning skills and metacognition will lead to learning which is more meaning, more efficient and which fulfils the challenge to course developers to develop deep level courses.

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